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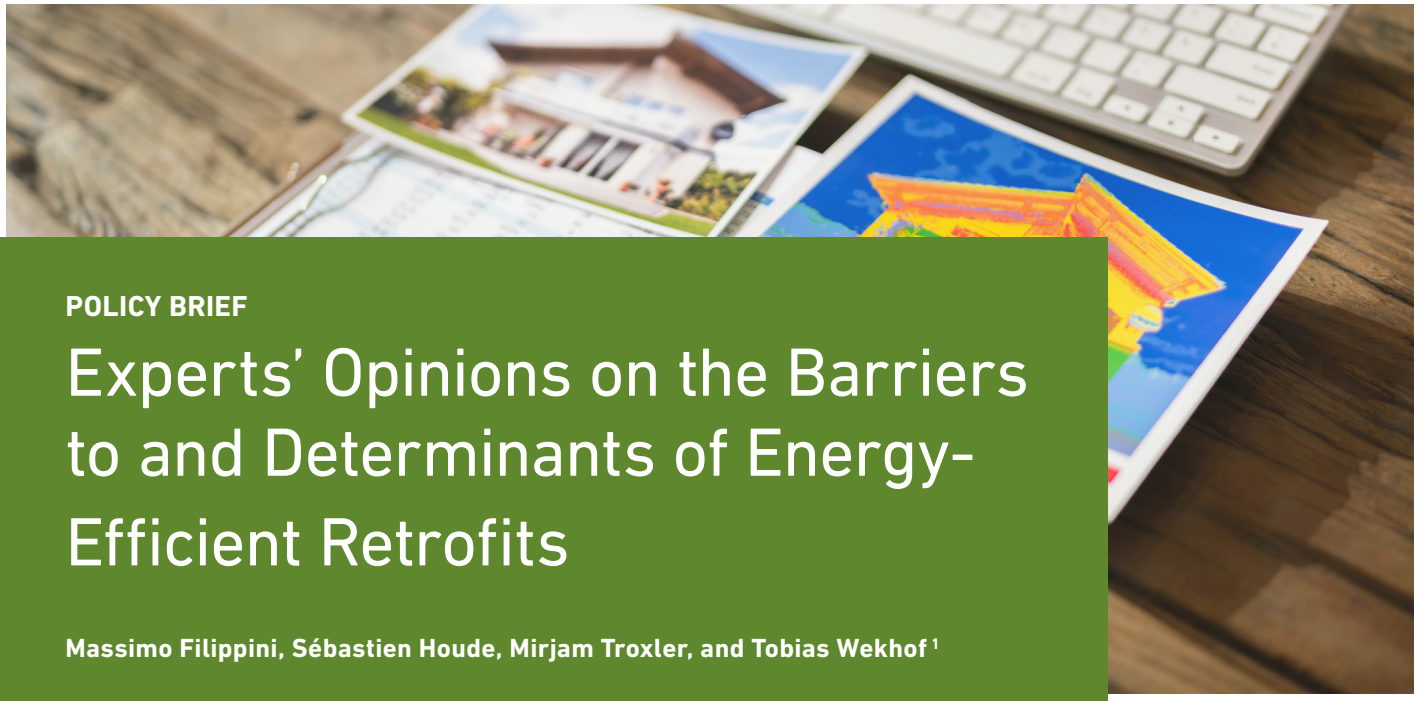

POLICY BRIEF

Experts' Opinions on the Barriers to and Determinants of Energy-Efficient Retrofits

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November 10, 2022

Executive Summary

- Survey with Swiss energy experts for the the Gebäudeenergie ausweis der Kantone (GEAK). According to the experts:
  - » energy retrofits' low financial return is the major barrier to investment for households.
  - » households who perform energy retrofits primarily to replace broken or obsolete technologies and not to save energy costs.
  - » existing subsidy programs for retrofits and audits currently offered in Switzerland are important determinants of energy retrofits.
  - » GEAK energy audits are primarily driven by these subsidy programs.
- Experts support new policies such as taxes to increase energy prices to improve the financial attractiveness of retrofits.
- The average cost of GEAK audits tends to exceed homeowners' willingness to pay for such a service. The market for energy audits thus requires government support to thrive.

Outline

In Switzerland, the building sector accounts for 40% of all final energy consumption and about one-third of all greenhouse gases emissions (GES) (Swiss Federal Office of Energy, 2022a). Two factors contribute to those high shares. First, Swiss buildings rely predominantly on oil and gas heating systems, which currently represent about 55% of all heating systems (Swiss Federal Office of Energy, 2022a). Second, many buildings would benefit from energy retrofits, but the take-up rate has remained very low. To illustrate, between 2010 and 2020, the main program used by the Swiss Federal Office of Energy and cantons to encourage energy retrofits (Das Gebäudeprogramm/Le Programme Bâtiments) has subsidised close to 135,000 projects and distributed CHF 2.3 billion in subsidies (Swiss Federal Office of Energy, 2022b). However, reaching the objectives stated under Energy Strategy 2050, which focuses on renewable energy and clean technologies, is still far to be guaranteed, and almost a doubling of the current renovation rate is required (Balthasar and Schalcher, 2020).

Several market barriers and failures, however, have slowed the adoption of energy retrofits in the building sector. Consequently, the solution resides not in a single policy instrument but rather in a portfolio of combined measures. But where should we start?

In this policy brief, we report on a research program conducted at the Centre for Energy Policy and Economics (CEPE) at ETH

* This research is financed by the Swiss Federal Office of Energy under the contract number SI/501886-01 and has been conducted at the Centre for Energy Policy and Economics at ETH Zurich. This policy brief contributes to Work Package 1 of the project. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect the view of the funding agency.

[1] The analysis and figures presented in this policy brief are based on Mirjam Troxler's Master Thesis, which was conducted at the Centre for Energy Policy and Economics (CEPE) at ETH Zurich and supervised by the present authors.

Zurich in our effort to identify the behavioural barriers to and determinants of energy-efficiency investments among owners of single-family homes living in Switzerland. As part of this research program, we interviewed energy audit experts who can assign the GEAK certification, one of the main energy certifications for buildings in Switzerland. Between January and March 2020, we contacted 1,497 GEAK experts all over Switzerland[2] and invited them to participate in an online survey. Of those, 348 experts accepted the invitation and participated (response rate of 23%). In the policy debate, such experts' views are particularly relevant because they have first-hand experience of the market. We report these experts' opinions regarding the important barriers to and determinants of energy retrofits, policy preferences, and their views about the role of energy audits and certification in homeowners' energy-efficient retrofit decisions.

Barriers and Determinants

What do energy-audit experts see as the main barriers to energy retrofits? As shown in Figure 1, experts believe lack of financial attractiveness due to high investment costs and low energy prices are the main two barriers homeowners face. A second type of barrier identified is lack of awareness and information. Finally, the so-called hassle costs of such investments and historical buildings, which might be too complicated or impossible to retrofit, are the third most-prevalent type of barriers experts

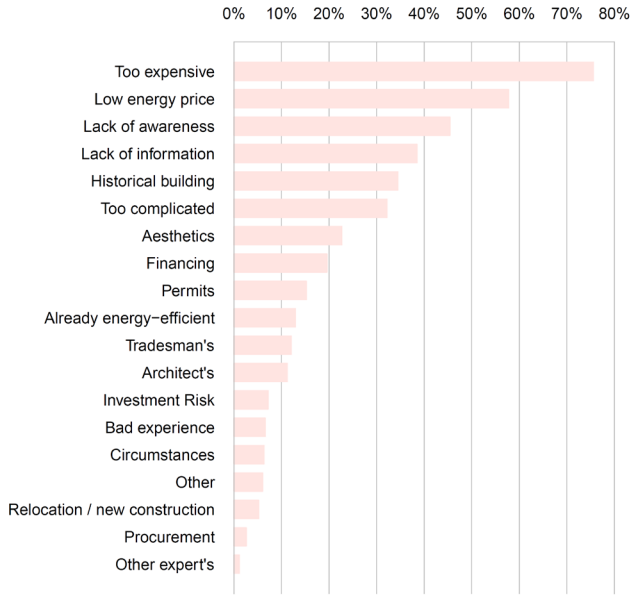

Figure 1: Experts' opinions on homeowners' barriers to energy retrofits

have identified.

As part of this same research program, we also directly surveyed homeowners about their perceived barriers to and determinants of energy retrofits (Filippini et al. 2022; Houde and Wekhof, 2021). Interestingly, from the homeowners' perspectives, the main argument against performing energy efficient retrofits is that they perceive their building being already energy efficient. But less than 15% of experts believe that this is an important barrier. As discussed in Houde and Wekhof (2021), homeowners might be biased in believing their home is already energy efficient and use this rationale to not invest in retrofits. The large discrepancy between experts' and homeowners' opinions suggests homeowners might be indeed biased with respect to the energy-efficiency potential of their buildings. Better information, notably through energy audits provided by GEAK experts, could help resolve this bias.

We also asked the energy experts what they perceived as the main determinants of retrofits for homeowners (Figure 2). Unlike for barriers, the monetary dimension was not the primary determinant. Although experts believe it is an important rationale, they rank it behind the need to replace broken or obsolete technologies, the need for comfort, and ecological concerns. These results map very closely to what homeowners themselves stated as the main determinants of their energy-retrofit investment decision (Houde and Wekhof, 2021).

Policy Preferences

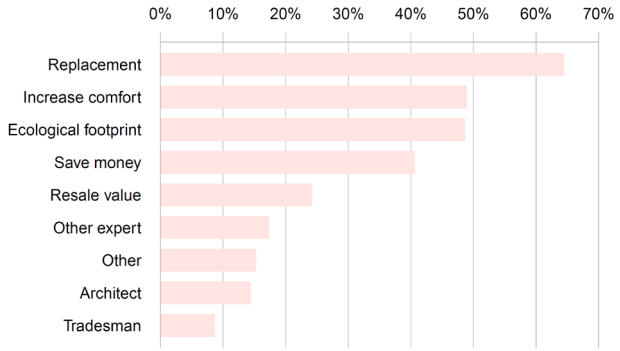

Figure 2: Experts' opinions on homeowners' determinants of energy retrofits

What are the policies energy experts favour to address the barriers they have identified? To answer this question, we first asked the experts to evaluate different types of existing policies promoting energy retrofits. In a follow-up open-ended question, we then asked them to describe what new policies should be put in place to further accelerate the take-up rate of energy retrofits.

Figure 3 shows the ranking of different existing policies with respect to their degree of usefulness, which experts determined for each policy by using a scale going from highly useful to not useful at all. GEAK experts almost unanimously consider subsidies as highly or very useful. Promotional programs (i.e. subsidies) and tax exemptions are also considered highly or very useful. Information programs, which are closely related to

[2] The email invitation and the online survey were written in French for experts located in French-speaking cantons and in German for the rest of Switzerland (i.e., German- and Italian-speaking cantons).

promotional programs, are also popular among experts. At the other end of the spectrum, policies that rely on digital solutions are not seen as especially useful. In particular, remote audits, online marketplaces for experts, and online review systems are not considered useful. Note, however, the survey was implemented before the COVID-19 pandemic, which may have changed experts' opinions about the role of digitalisation in this market.

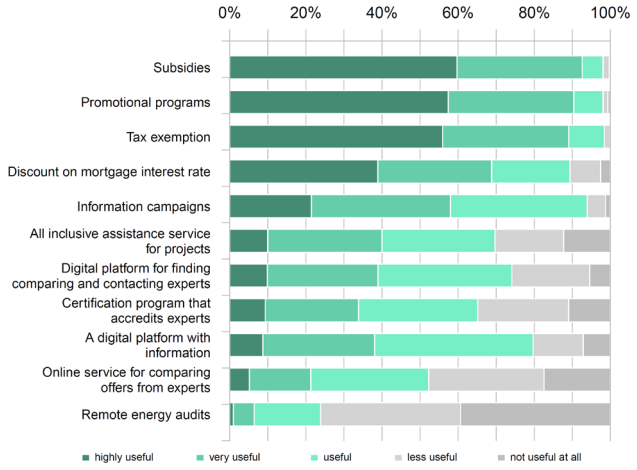

Figure 3: Experts' opinions on usefulness of existing policy instruments

When asked about new or additional policies that should be put in place to increase the take-up rate of energy retrofits, experts' opinions are highly consistent with the barriers they perceived as being important. First, they propose using tax impositions and other instruments that would increase energy prices as a way to increase the return on those investments. Information-related measures then rank second, and subsidies come in third place. Experts thus support the stick over the carrot as additional instruments. It is important to note in Switzerland, energy-efficiency subsidy programs are already in place and can be very generous, which may explain experts' bias toward taxes and higher energy prices. Finally, mandates are also a popular policy, almost as much as subsidies.

The Role of Energy Certification

In Switzerland, several building certification programs related to energy efficiency exist. Minergie and GEAK are the most well-known certification programs, and each has a special purpose. The GEAK Association is, however, the only one that is entirely public and under the jurisdiction of Swiss cantons. The goal of the GEAK program is to provide energy audits by experts, which yields an A to G letter grade. The GEAK program also offers different types of audit services. The GEAK Plus audit, for instance, offers the letter-grade certification with a detailed menu of three options to retrofit a building together with a financial analysis of each option. The certification is a voluntary option for homeowners. Several cantons, however, have designed policies around the GEAK program, and some offer generous subsidies for GEAK audits and retrofit subsidies conditional on having a GEAK audit performed. However, some cantons also mandate sellers provide a GEAK certification rating before selling a property.

The GEAK certification resembles other energy certification programs used in other countries. In Europe, for instance, Energy Performance Certificates (EPCs) are the cornerstone of the EU's energy-efficiency directives. EPCs are used to establish minimum standards for buildings, mandates for renovation of highly inefficient buildings, and tax or subsidy eligibility.

In the building sector, an energy certification program is a low-hanging fruit to address informational asymmetries between buyers and sellers. Energy labelling schemes are also designed to increase the focus of the energy dimension in the investment decision. This can induce a so-called green premium that rewards more energy-efficient buildings. Overall, an energy certification can create a virtuous circle in which information and attention related to energy efficiency are disclosed to prospective buyers, which generates more interest for highly efficient properties, which, in turn, induces investors and developers to invest more in energy efficiency. This is an example of a demand-pull policy that aims to move the energy-efficiency frontier into the building sector.

How do GEAK experts perceive the effectiveness of their own certification program? First, we asked the experts why homeowners perform GEAK audits. The existence of promotional programs (i.e., subsidies for retrofits or audits) offered by different levels of governments are a leading source of demand for GEAK audits. Regulations requiring a certification at the time of sale is also an important reason. A much smaller share of experts believes homeowners would voluntarily request GEAK audits, before or during a retrofit, absent subsidy programs or mandates for information disclosure. Therefore, according to GEAK experts, an important driver of the demand for their services comes from other energy-efficiency policies linked to GEAK (Figure 4).

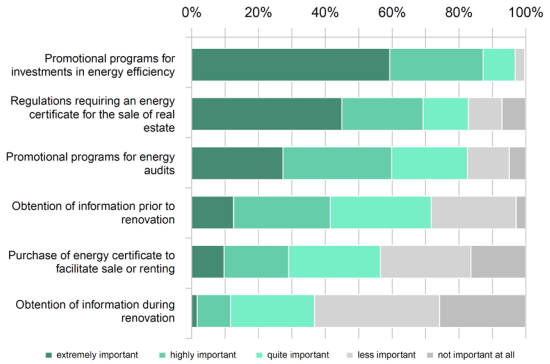

Figure 4: Experts' opinions on homeowners' determinants of GEAK energy audits

Absent such policies, they believe demand for energy audits could be much smaller. This point becomes clear when we elicit homeowners' willingness to pay for a GEAK audit and compare these values to experts' stated costs for such an audit. We found homeowners are willing to pay CHF 658 for a standard GEAK audit and CHF 1,597 for a GEAK Plus audit. Experts' reported costs for those two types of audits are CHF 959 and CHF 2,208, respec-

tively. There is then a significant price gap, which is consistent with the size of the subsidy for energy audits some cantons offer (in the CHF 500 to 1,000 range). In Switzerland, the market for energy audits thus needs government support to thrive.

Finally, we also asked GEAK experts whether their customers ultimately invest in energy efficiency after completing a GEAK audit. Experts reported about 74% of the customers who commissioned an audit followed up on the recommendations made, which suggests audits do encourage actual investments and are an important part of the investment decision.

Implications and Policy Recommendations

Energy audit experts have a first-hand view of the market for energy retrofits. Their beliefs about homeowners' barriers and determinants suggest that, on the one hand, energy retrofits lack financial attractiveness, which deters several homeowners. On the other hand, for homeowners who do invest, such investment is rather opportunistic and associated with important co-benefits.

Furthermore, energy audits and, in particular, the GEAK program are important starting points for energy retrofits. However, the cost to administer such audits tends to be above what homeowners are willing to pay. This points to an important market barrier towards which the federal and cantonal governments should give additional attention.

The GEAK certification and, more broadly, other energy certification programs should play an important role in Switzerland's long-term energy strategy. A well-designed certification can become a focal point of energy-efficiency policies that enable subsidy programs and mandates and increase the energy efficiency feature in the real estate market. In the future, this policy could be further leveraged in Switzerland notably by allowing renters to perform GEAK audits and having rental properties certified.

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Cover Photo

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